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Corpus Callosum Infarction: Case Report

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Abstract **Case Report**

Corpus callosum infarction is uncommon mostly because of rich vascular supply and collateral circulations. It´s shares the same risk factors as other cerebral locations. MRI establishes the diagnosis of ischemic stroke of the corpus callosum, particularly through the diffusion-weighted sequence. Our article offers a thorough understanding of callosal infarction, aiding clinicians in early diagnosis, timely intervention, and substantially enhancing prognosis.

Keywords: Corpus callosum, infarction, MRI, Restricted diffusion.

INTRODUCTION

The corpus callosum (CC) is the largest bundle of association fibers in white matter, functioning both as a pathway for sensory, movement, vision, hearing, emotion, and cognition, and as a connection between the left and right cerebral hemispheres [1-3]. Infarction of the corpus callosum is rare owing to the ample blood supply and sufficient collateral circulations [1].

MRI is the gold standard through the diffusion-weighted sequence for the early detection of acute cerebral ischemia to examine the prevalence, lesion patterns, clinical characteristics, risk factors, and etiology of corpus callosum infarction [3].

CASE

70-year-old men presented with a subacute onset of confusion, drowsiness and malaise followed by the slow development of expressive aphasia and left hemiplegia, over the following five days. The patient was known for type 2 diabetes, and arterial hypertension. No history of fever or other systemic symptoms were reported. Brain MRI showed a signal abnormality in the body of the corpus callosum extending to the splenium, associated with cortical-subcortical lesions in the right parasagittal frontal lobe with hyperintensity on T2 and FLAIR sequences, diffusion restriction, and no enhancement following gadolinium injection; containing hemorrhagic foci with hypo intensity on T2*, without mass effect on the midline structures, with minimal meningeal hemorrhage (Figure 1 A-D). The time-of-flight (TOF) images showed no anomalies.

DISCUSSION

Infarction of the CC is a relatively rare occurrence, as only 3–8 % of infarcts involve the CC [2]. Corpus callosum infarction and the resulting callosal disconnection syndrome are generally rare. The splenium is the most susceptible location for ischemic corpus callosum lesions. Splenium infarctions are often linked to bilateral cerebral hemisphere involvement. Genu and/or body infarctions are associated with atherosclerosis. The most common cause of corpus callosum infarction is likely embolism [3].

However, the precise pathophysiology of the splenium infarction was unknown [2]. The blood supply to the corpus callosum comes from the anterior and posterior circulation and is supported by well-developed collateral circulation, resulting in a low incidence of corpus callosum infarction [1]. The rostrum and genu are supplied by the subcallosal and the medial callosal artery, respectively [3].

Both vessels originate from the anterior communicating artery. The pericallosal artery, which is a continuation of the anterior cerebral artery (ACA), branches into four vessels, supplying the majority of blood to the corpus callosum body. The posterior pericallosal artery, a branch of the posterior cerebral artery (PCA), is a short penetrating arteriole that provides blood supply to the splenium [3].

The most prevalent causes of infarction are hypertension, dyslipidemia, and diabetes mellitus. These findings highlight the similarities between callosal infarction and other ischemic strokes [1].

The main etiology was large-artery atherosclerosis, often accompanied by stenosis or occlusion of multiple large cerebral vessels [1].

The clinical manifestations of callosal infarction typically present with mental or cognitive disorders, often accompanied by mild motor or sensory impairment [1].

Dumas described two classic symptoms of corpus callosum infarction [1], callosal disconnection syndrome, including apraxia, agraphia, tactile anomia of the left hand, and alien hand syndrome (AHS) [4–6], as well as [2] frontal-type gait disorders, including a wide base, shuffling gait with short steps, and loss of concomitant arm swing as a result of lacunar lesions in the anterior corpus callosum portion [3].

The internal carotid system and vertebral basilar artery system both contribute to callosal blood circulation. Arteries of the posterior circulation are smaller and primarily consist of vertical branches that receive blood supply from bilateral vertebral arteries, forming the pericallosal artery plexus [1].

The splenium was identified as the location most susceptible to ischemia. It was assumed that this may result from the greater incidence of infarction in areas with PCA supply [3].

Therefore, the presence of callosal infarction suggests extensive lesions of cerebral vessels, often accompanied by infarction in other cerebral areas [1]. Therefore, corpus callosum infarction syndrome is relatively rare, with only a few, mainly small-scale systematic clinical investigations being reported [3].

Furthermore, radiological findings are sometimes misleading [4]. MRI, especially DWI can detect the early local lesions and help determine the condition, which can then help guide the diagnosis of cerebral infarction.

The combination of clinical and radiological findings, along with the limited number of reported cases, can pose challenges in making a differential diagnosis and occasionally lead to the consideration of biopsy [4].

Figures Legends

Magnetic resonance of the brain: Figure 1A–D) showed a signal abnormality in the body of the corpus callosum extending to the splenium, with hyperintensity on T2 and FLAIR sequences, diffusion restriction, containing hemorrhagic foci with hypo intensity on T2*, without mass effect on the midline structures.

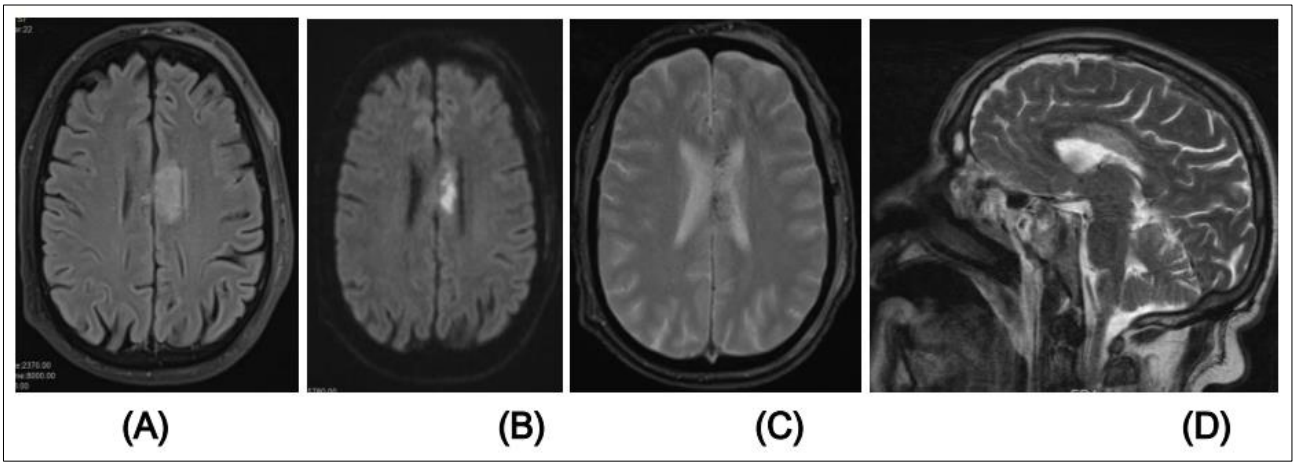

Figure 1 A-D: (A): Axial section FLAIR, (B): Diffusion restriction, (C): T2*, (D): Sagittal section T2: Acute infarction of the body of the corpus callosum extending to the splenium with hemorrhagic foci on T2*

CONCLUSION

The incidence of corpus callosum infarction is low, and it presents with diverse clinical manifestations, easily leading to missed or delayed diagnosis. Benefit from the progress of imaging technology, especially the diffusion-weighted imaging (DWI), has enabled the knowledge of the corpus callosum infarction to be deepened.

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